

First Named Inventor: William R. Priedeman, Jr.

Application No.: 10/019,160

-3-

AMENDMENTS TO THE CLAIMS

No amendments are hereby made to the claims. Original claims 1 through 37 read as follows:

1. (Original) In a process for making a three-dimensional object by dispensing solidifiable modeling material in a predetermined pattern so as to define the three-dimensional object in coordination with dispensing solidifiable support material so as to define a support structure for the three-dimensional object, the support structure thereby having portions thereof in contact with the object, the improvement comprising:

forming at least those portions of the support structure contacting the object from an alkali-soluble thermoplastic material comprising:
a base polymer containing a carboxylic acid; and
a plasticizer.

2. (Original) The process of claim 1, wherein the carboxylic acid is methacrylic acid present in an amount between about 15 weight percent and 60 weight percent of the base polymer.

3. (Original) The process of claim 2, wherein the base polymer further contains an alkyl methacrylate.

4. (Original) The process of claim 3, wherein the alkyl methacrylate is methyl methacrylate.

5. (Original) The process of claim 4, wherein the base polymer contains between about a 1:1 to a 1:2 weight percent ratio of methacrylic acid to methyl methacrylate.

6. (Original) The process of claim 4, wherein the alkali-soluble thermoplastic material contains between about 84 weight percent and 74 weight percent of the base polymer and contains between about 16 weight percent and 26 weight percent of the plasticizer.

First Named Inventor: William R. Priedeman, Jr.

Application No.: 10/019,160

-4-

7. (Original) The process of claim 1, wherein the base polymer further contains an alkyl methacrylate.

8. (Original) The process of claim 2, wherein the alkali-soluble thermoplastic material contains between about 10 weight percent and 30 weight percent of the plasticizer.

9. (Original) The process of claim 8, wherein the plasticizer is p-t-butylphenyl diphenyl phosphate, butyl benzyl phthalate, 7-(2,6,6,8-tetramethyl-4-oxa-3-oxononyl) benzyl phthalate, C7/C9 alkyl benzyl phthalate, 2-ethylhexyl diphenyl phosphate or isodecyl diphenyl phosphate.

10. (Original) The process of claim 1, wherein the alkali-soluble thermoplastic material has a melt flow index of between about 5 g/10 minutes and 10 g/10 minutes under a load of 1.2 kg at 230 °C.

11. (Original) The process of claim 1 and further comprising:
removing the support structure after the object is made by placing the object in an
alkaline bath.

12. (Original) The process of claim 11, wherein the step of removing the support structure includes the step of generating an ultrasonic frequency in the alkaline bath.

13. (Original) The process of claim 11, wherein the step of removing the support structure includes the step of heating the alkaline bath.

14. (Original) An additive process for making three-dimensional objects, comprising:
dispensing an alkali-insoluble modeling material in a predetermined pattern defining
a three-dimensional object having overhanging portions that require support
during formation; and

First Named Inventor: William R. Priedeman, Jr.

Application No.: 10/019,160

-5-

dispensing an alkali-soluble support material in the space beneath the overhanging portions of the three-dimensional object in coordination with the dispensing of the modeling material to form a three-dimensional support structure for the object, the alkali-soluble support material comprising a base polymer containing between about 15 weight percent and 60 weight percent of a carboxylic acid, and a plasticizer;
whereby the alkali-soluble support material may be dissolved from the three-dimensional object by application of an alkaline solution.

15. (Original) The process of claim 14, wherein the carboxylic acid is methacrylic acid.

16. (Original) The process of claim 15, wherein the base polymer further contains an alkyl methacrylate.

17. (Original) The process of claim 16, wherein the alkyl methacrylate is methyl methacrylate.

18. (Original) The process of claim 17, wherein the base polymer contains between about a 1:1 to a 1:2 weight percent ratio of methacrylic acid to methyl methacrylate.

19. (Original) The process of claim 17, wherein the alkali-soluble support material contains between about 84 weight percent and 74 weight percent of the base polymer and contains between about 16 weight percent and 26 weight percent of the plasticizer.

20. (Original) The process of claim 14, wherein the base polymer further contains an alkyl methacrylate.

First Named Inventor: William R. Priedeman, Jr.

Application No.: 10/019,160

-6-

21. (Original) The process of claim 14, wherein the alkali-soluble support material contains between about 10 weight percent and 30 weight percent of the plasticizer.

22. (Original) The process of claim 21, wherein the plasticizer is p-t-butylphenyl diphenyl phosphate, butyl benzyl phthalate, 7-(2,6,6,8-tetramethyl-4-oxa-3-oxononyl) benzyl phthalate, C7/C9 alkyl benzyl phthalate, 2-ethylhexyl diphenyl phosphate or isodecyl diphenyl phosphate.

23. (Original) The process of claim 14, wherein the alkali-soluble thermoplastic material has a melt flow index of between about 5 g/10 minutes and 10 g/10 minutes under a load of 1.2 kg at 230 °C.

24. (Original) In a process for making three-dimensional objects by depositing solidifiable material onto a base, the improvement comprising:

providing as the solidifiable material an alkali-soluble thermoplastic comprising:

a base polymer containing a carboxylic acid; and
a plasticizer.

25. (Original) The process of claim 24, wherein the base is contained in a build envelope maintained at a build envelope temperature and wherein the plasticizer is selected and present in an amount so as to increase the melt flow index of the base polymer, while maintaining the glass transition temperature of the base polymer at a temperature high enough so that the solidifiable material does not soften at the build envelope temperature.

26. (Original) The process of claim 24, wherein the carboxylic acid is methacrylic acid present in an amount between about 15 weight percent and 60 weight percent of the base polymer.

27. (Original) The process of claim 26, wherein the base polymer further contains an alkyl methacrylate.

First Named Inventor: William R. Priedeman, Jr.

Application No.: 10/019,160

-7-

28. (Original) The process of claim 27, wherein the alkyl methacrylate is methyl methacrylate.

29. (Original) The process of claim 28, wherein the base polymer contains between about a 1:1 to a 1:2 weight percent ratio of methacrylic acid to methyl methacrylate.

30. (Original) The process of claim 28, wherein the solidifiable material contains between about 84 weight percent and 74 weight percent of the base polymer and contains between about 16 weight percent and 26 weight percent of the plasticizer.

31. (Original) The process of claim 25, wherein the base polymer further contains an alkyl methacrylate.

32. (Original) The process of claim 25, wherein the solidifiable material has a melt flow index of between about 5 g/10 minutes and 10 g/10 minutes under a load of 1.2 kg at 230 °C.

33. (Original) The process of claim 26, wherein the solidifiable material contains between about 10 weight percent and 30 weight percent of the plasticizer.

34. (Original) The process of claim 33, wherein the plasticizer is p-t-butylphenyl diphenyl phosphate, butyl benzyl phthalate, 7-(2,6,6,8-tetramethyl-4-oxa-3-oxononyl) benzyl phthalate, C7/C9 alkyl benzyl phthalate, 2-ethylhexyl diphenyl phosphate or isodecyl diphenyl phosphate.

35. (Original) As an article of manufacture, a three-dimensional object comprised of an alkali-soluble thermoplastic material comprising:

- a base polymer containing a carboxylic acid; and
- a plasticizer.

First Named Inventor: William R. Priedeman, Jr.

Application No.: 10/019,160

-8-

36. (Original) The article of claim 35, wherein the carboxylic acid is methacrylic acid present in an amount between about 15 weight percent and 60 weight percent of the base polymer.

37. (Original) The article of claim 36, wherein the base polymer further contains an alkyl methacrylate.